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## ATRYTONOPSIS HIANNA BIOLOGY AND LIFE HISTORY IN THE OZARKS

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### ABSTRACT

The ovum, first and final instar larva, and pupa of *Atrytonopsis hianna* (Scudder) are described and illustrated. The biology of the Ozarks populations is given and the association between *A. hianna* and *Hesperia metea* Scudder is discussed.

### INTRODUCTION

IN THE MISSOURI AND ARKANSAS OZARKS *Atrytonopsis hianna* (Scudder) occurs in local colonies in woodland clearings, cedar glades, or forest edges in close association with beard grass (*Andropogon gerardi* Vitm.). This is the only known food plant for *A. hianna* in this region. This is also the food plant of *Hesperia metea* Scudder and these two species are consistently found together in the same localities. We have reared *A. hianna* on numerous occasions from both Missouri and Arkansas populations. The illustrations are from specimens collected near Warsaw, Missouri.

### MATERIALS AND METHODS

Ova were obtained by confining wild females in nylon chiffon bags over potted plants of *Andropogon gerardi*. Larvae were reared on potted plants of this grass and on others that had been planted outdoors and enclosed in screen wire coverings. A Wild M5 stereomicroscope with drawing tube and photo-tube attachments was used in preparing the illustrations of the ovum and first instar larva.

### DESCRIPTION OF EARLY STAGES

OVUM: Width 1.25 mm, height .80 mm. Color bright lemon yellow when first laid changing to pale brown with pinkish accent dorsally. Micropyle coral red. Eclosion in seven to eight days.

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**FIRST INSTAR LARVA:** Head and prothoracic shield deep reddish purple, shiny. Freshly emerged larvae yellow, after feeding all but abdominal segments nine and ten turn pale green. Surinal plate with long white setae, body thinly covered with long white hairs, prothoracic color paler. The first instar larvae are active silk spinners, trailing a silken thread as they move about. Stadium period: nine days.

**SECOND INSTAR LARVA:** Head dull orange brown, mandibles darker brown. Head thickly covered with minute white setae. Prothorax white, prothoracic shield, slender, shiny black. Body color dark green, posterior segments dull brown, anal segment with thick black setae, rest of body sparsely covered with minute black setae. Integument translucent. The second instar larval tent is constructed by fastening the top two thirds of two grass blades together. The top of the tent is left open. Stadium period: nine days.

**THIRD INSTAR LARVA:** Head pale orange brown, midcranial inflection edged with paler lines, stemmata black, mandibles dark brown. Head thickly covered with a mixture of short and longer brown setae. Body color pale pinkish brown with green undertones due to translucent integument, abdominal segments eight and nine paler, segment ten dull brown. Prothorax creamy white, prothoracic shield, slender, shiny black. Stadium period: nine days.

**FOURTH INSTAR LARVA:** Head dull orange brown, stemmata and mandibles black. Head thickly covered with short pale setae and a few longer white hairs. Body color bright pink dorsally, anal segment darker, almost black, with some long black hairs. Rest of body covered with minute white setae, integument translucent. Abdominal areas dull green. Prothorax creamy white, prothoracic shield black, slender. Stadium period: nine days.

**FIFTH INSTAR LARVA:** Head light brown, frons pale orange, labrum dark brown, mandibles and stemmata black. Head thickly covered with short white setae and a few longer white hairs. Body color lavender pink dorsally, bright pink ninth abdominal segment, anal segment grayish brown with long black hairs, rest of body thinly covered with short white setae. Prothorax white, prothoracic shield, slender, shiny black. Abdomen grayish white. Spiracles tiny pale yellow dots. The fifth instar larvae live in a three- to four-inch tube composed of several grass blades fastened together, open at the top and bottom. These tents are

usually constructed within six inches of the tips of the leaves. Feeding slows up greatly in this instar with the larvae spending many days aestivating. Before transforming to the next instar the larvae seal the tent at top and bottom. Stadium period: variable up to 19 days.

**SIXTH INSTAR LARVA:** Head deep red, mandibles black, frons and area below midcranial inflections deep reddish orange. Head granulose and thickly covered with short white setae. Body color light pink dorsally, brighter on abdominal segments eight and nine, tenth segment darker brown dorsally. There is an inconspicuous middorsal gray line. Abdomen and prothorax pale translucent gray. Spiracles pale orange, inconspicuous. Prothoracic shield, slender, shiny black. The body now has a downy appearance due to a thick covering of soft white hair. The larvae in this instar pass through alternate periods of eating and aestivating. The larval tent is the same as in the fifth instar. Stadium period: variable, an average of six to seven weeks.

**SEVENTH (FINAL) INSTAR LARVA:** Head width 3.5 mm, deep reddish purple, granulose, unmarked but with brown shading below laterofacial suture lines, deeply cleft at midcranial inflection, mandibles black. Head covered with short reddish setae and longer white hairs. Position and size of stemmata as illustrated. Length of mature larvae 29-32 mm. Body color pale pinkish lavender dorsally, abdominal segments eight and nine pale pink, anal segment depressed, pale glossy brown. Prothorax pale gray, prothoracic shield dark brown, surface granulated. Abdomen pale grayish white, thoracic legs pale brown. Entire body covered with long yellowish white hair, shorter on the abdominal areas. The prolegs have orange hair and the anal segment has bright orange setae, coarser and shorter than on rest of body. Only the last abdominal spiracles are noticeable, they are pale brown. Final instar larvae have two small wax pad areas beneath the posterior segments of the abdomen. The final instar larvae feed consistently once the cooler damp weather of September begins and by early October the larvae seal themselves in a nest among the leaves at the base of the food plant to pass the winter as mature larvae, pupating early the following spring.

**PUPA:** Length 18.5-20 mm, width at widest point of wing cases 4.5-4.75 mm, width at eyes 3.50-3.65 mm. Wing cases light brown with olive tint. Head, eye cases and upper thorax darker brown. Thoracic spiracles ruby red. Tongue case deep brown, detached below wing cases. Abdominal segments light orange



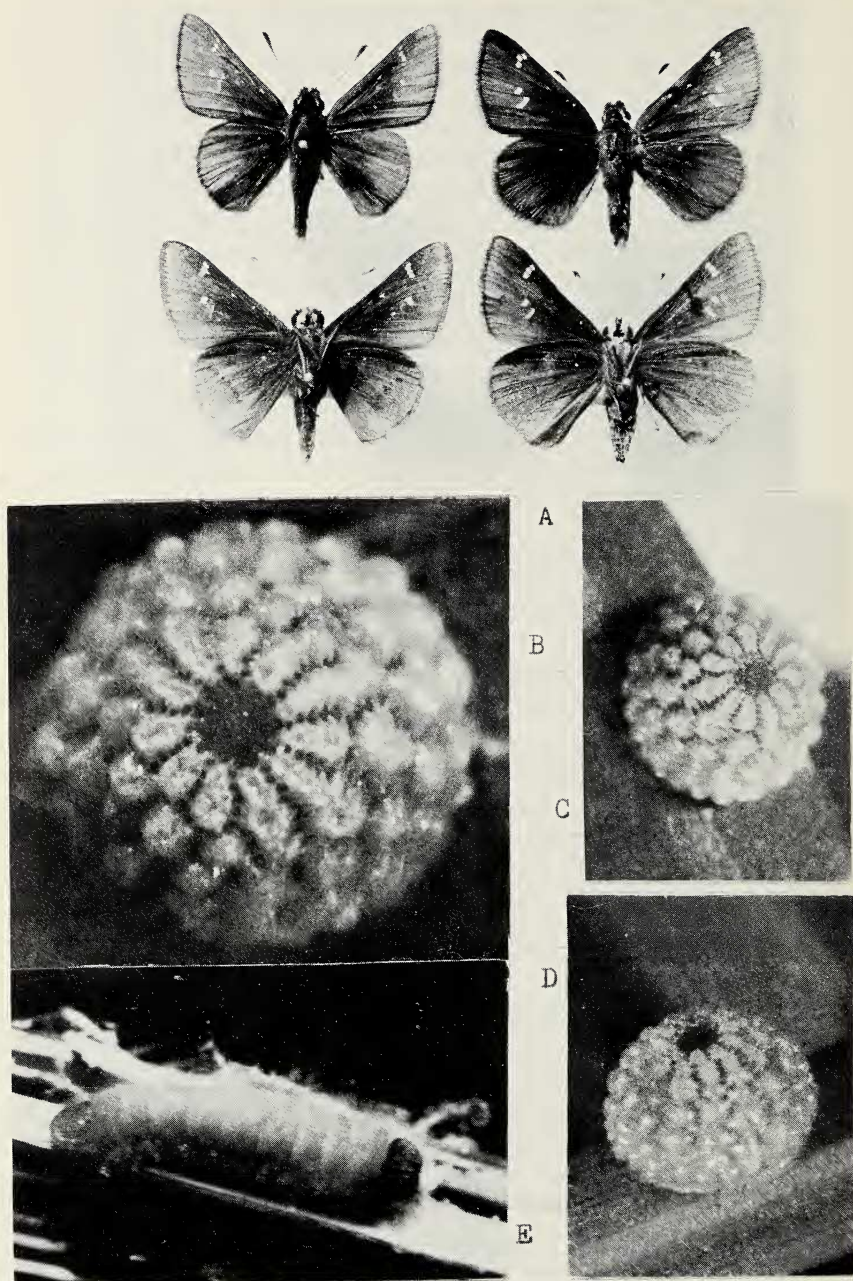


Fig. 1.—*Atrytonopsis hianna* (Scudder), A, male and female, ventral and dorsal view of specimens from Warsaw, Missouri. B, C, D, different aspects of the ovum. E, mature larva.

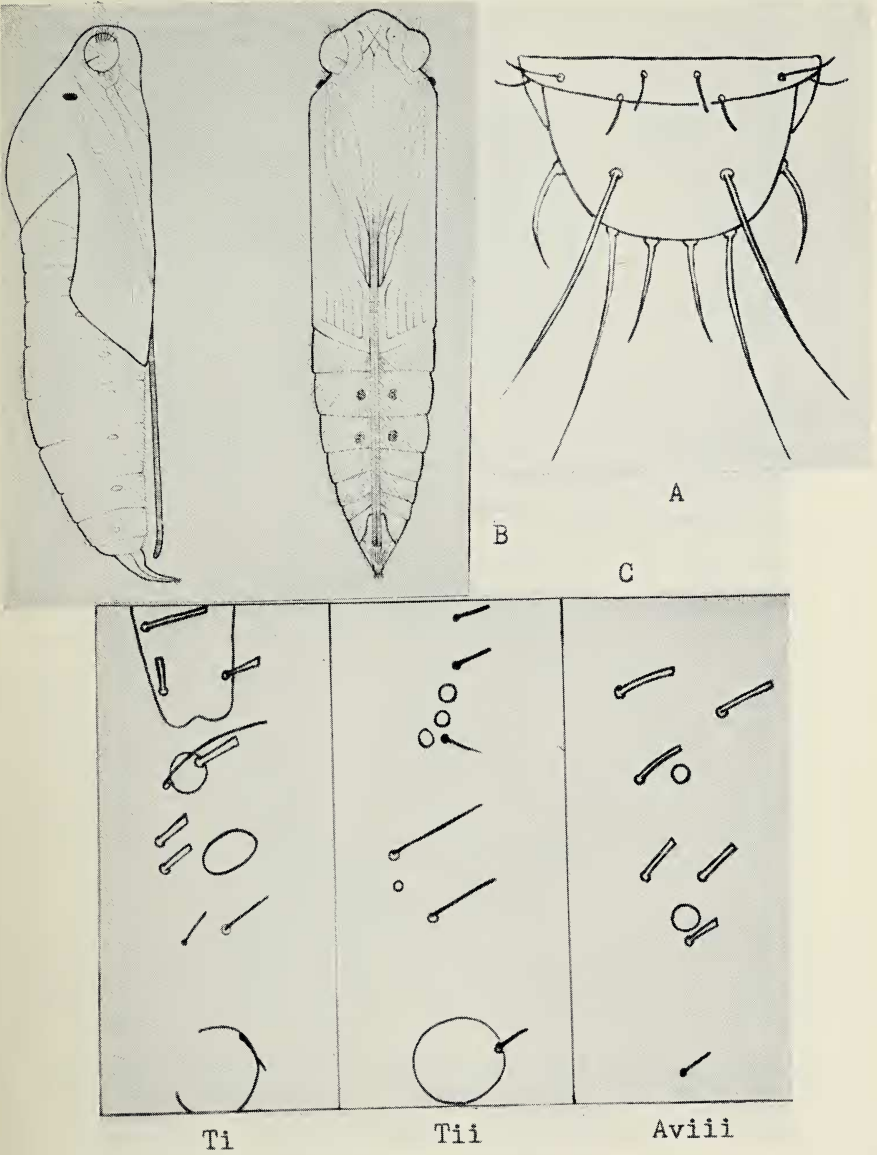


Fig. 2.—*Atrytonopsis hianna* (Scudder), A, first instar suranal plate. B, pupa, ventral and right lateral aspect. C, first instar setal maps of prothorax, mesothorax, eighth abdominal segment, all in left lateral aspect.

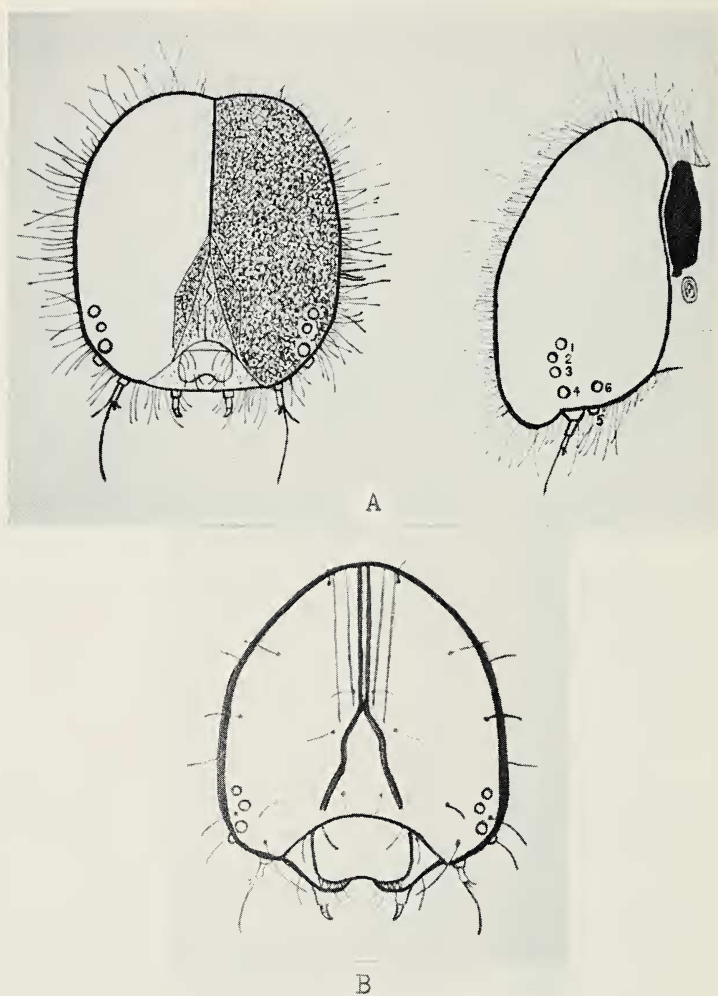


Fig. 3.—*Atrytonopsis hianna* (Scudder), A, head of final instar larva, frontal and left lateral aspect. B, head of first instar larva, frontal aspect.

with pink overcast, intersegmental folds pale orange brown. Cremaster and anal segments darker brown. Cremaster 2.75 mm in length, strongly curved ventrally, without hooks but densely covered at the tip with stiff brown setae. Pupation occurs in the base of the *Andropogon* clumps, one to three inches above ground level in a sealed case of silk and grass leaves.

### DISCUSSION

In the introduction it was mentioned that *A. hianna* occurs consistently with *H. metea*. Both species are univoltine flying for only a few weeks in the spring but *metea* normally begins emergence one or two weeks ahead of *hianna*. The first *hianna* normally appear during the first week in May at Warsaw, Missouri (earlier in Arkansas) and the imagines have disappeared by the end of May. While both species utilize the same food plant their different feeding and resting positions seem to effectively preclude any severe competition for the host plant. While *metea* in its later instars lives in a tent in the base of the grass clumps *hianna* is living in a tent from one to several feet above ground and does not appear to enter the base of the plants until ready to hibernate after feeding is completed in the autumn. *A. hianna* is an avid flower visitor and females are best collected by searching the flowers of *Verbena*, *Camassia*, and *Fragaria* growing in the vicinity of *Andropogon*. Males exhibit strong "perching" tendencies and will dart out at any passing butterfly or insect that remotely resembles a female *hianna*. Both sexes are wary and not easily collected. The numbers of imagines present from year to year varies greatly but to date no parasites have been bred from any of the wild larvae collected.

### ACKNOWLEDGMENTS

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